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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,743	11/17/2003	Kiyoshi Sato	9281-4692	6725

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EXAMINER

CHEN, TIANJIE

ART UNIT PAPER NUMBER

2627

DATE MAILED: 09/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/716,743

Applicant(s)

SATO ET AL.

Examiner

Tianjie Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 7, 10 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 5 and 12-17 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 6, 8 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Non-Final Rejection***

***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Election/Restrictions***

2. Applicant's election without traverse of Species I, claims 1-6, 8, 9, 12-17 in the reply filed on 07/05/2006 is acknowledged.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Because claim 16 recites "the length of the second coil segment in a first direction orthogonal to the direction of electric current is larger than the length of the first coil segment in the first direction." However, Fig. 4 shows that the length of the second coil segment 56 in a first direction orthogonal to the direction of electric current is less than the length of the first coil segment 55 in the first direction. Any person skilled in the art to which it pertains, or with which it is most nearly connected, is unable to make and use the this invention.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Cohen et al (US 5,995,342).

Claim 1, Cohen et al shows a thin-film magnetic head in Figs. 1 and 2 having an opposing face ABS that opposes a recording medium, the thin-film magnetic head including: a lower core layer 20 extending from the opposing face in a height direction; a magnetic layer 28 directly or indirectly connected to the lower core layer at a position a predetermined distance away from the opposing face in the height direction; and a coil toroidally 36 (Fig. 1A) wound around the magnetic layer 28. The coil including: a plurality of first coil segments 36A that cross over the magnetic layer, the first coil segments being separated from each other with predetermined gaps therebetween in the height direction; a coil insulating layer 40 covering the first coil segments, the magnetic layer 28 being formed on the coil insulating layer 40; a plurality of second coil segments 36B that cross over the magnetic layer, the second coil segments being formed on the coil insulating layer; and a plurality of bank layers disposed at two sides of the magnetic layer in the track width direction (Fig. 1A), the bank layers being electrically connected with ends of the first coil segments; wherein ends of each second coil segment in the track width direction are electrically

connected with upper faces of the bank layers to connect ends of the adjacent first coil layers with each other via the second coil segments, thereby forming a toroidal coil.

2. The thin-film magnetic head according to claim 1, further including a lower magnetic pole layer formed above the lower core layer and a gap layer including a nonmagnetic metal material formed on the lower magnetic pole layer, the lower magnetic pole layer and the gap layer being formed by plating, wherein the magnetic layer is formed on the gap layer and functions as an upper magnetic pole layer; the lower magnetic pole layer, the gap layer, and the magnetic layer constitute a first composite structure; the width of the first composite structure in the track width direction at the opposing face defines a track width  $T_w$ ; and each banking layer comprises a second composite structure including a first sublayer including the same material as the lower magnetic pole layer, a second sublayer including the same material as the gap layer, and a third sublayer including the same material as the magnetic layer.

Claim 12, Cohen et al shows in Figs. 3A-3C that the distance between an end of the first coil segment and an adjacent end of the adjacent first coil segment is larger than the minimum distance between the adjacent first coil segments in a region where the first coil segments overlap the magnetic layer, and this relationship is satisfied in at least one set of adjacent first coil segments.

Claim 13, Cohen et al further shows in Fig. 1 that the first coil segments have portions parallel to each other in the region where the first coil segments overlap the magnetic layer.

Claim 14, Cohen et al shows in Figs. 3A-3C that the distance between an end of the second coil segment and an end of the second coil segment is larger than the

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minimum distance between the adjacent second coil segments in a region where the second coil segments overlap the magnetic layer, and this relationship is satisfied in at least one set of adjacent second coil segments.

Claim 15, Cohen et al further shows in Fig. 1 that the second coil segments have portions parallel to each other in the region overlap the magnetic layer.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 5, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al in view of Komuro et al (US 6,530,141).

Claim 4, Cohen et al fails to show a lower pole layer and an upper pole layer.

Komuro et al shows a thin-film magnetic head in Fig. 2 including: a lower magnetic pole layer 18 on the lower core layer 15; a gap layer 17 including a nonmagnetic metal material (Column 8, lines 30-33) and disposed on the lower magnetic pole layer 18; and an upper magnetic pole layer disposed on the gap layer, wherein the lower magnetic pole layer, the gap layer, and upper magnetic pole layer are formed by plating and constitute a magnetic pole end layer, wherein a width of the magnetic pole end layer in the track width direction at the opposing face defines a track width  $T_w$ , and the magnetic layer is formed on the magnetic pole end layer.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply Komuro et al's structure into Cohen et al's device since Komuro et al teaches that his structure would provide high recording field and high frequency driven head with very high recording density (Column 1, lines 52-62).

Claim 5, Komuro et al teaches that the saturation magnetic flux density of the magnetic layer (upper magnetic film 11) has flux density of 1.0T (Column 64-67 and column 8, lines 45-48) and the upper magnetic pole layer 16 has flux density of 1.5T (Column 8, lines 33-38).

Claim 16, Cohen et al shows in Fig. 3d that wherein the length of the second coil segment (Solid lines) in a first direction orthogonal to the direction of electric current is larger than the length of the first coil segment (dotted lines) in the first direction.

Claim 17, Cohen et al further shows that the thickness of the second coil segment, which is the same as 32B in Fig. 2 (Column 20, lines 52-60), is larger than the thickness of the first coil segment 32A.

***Allowable Subject Matter***

6. Claim 2, 3, 6, 8, and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

- With regard to claim 2, as the closest reference Cohen et al (US 5,995,342) shows a thin-film magnetic head having an opposing face that opposes a recording medium, the thin-film magnetic head including: a lower core layer

extending from the opposing face in a height direction; a magnetic layer directly or indirectly connected to the lower core layer at a position a predetermined distance away from the opposing face in the height direction; and a coil toroidally wound around the magnetic layer, the coil including: a plurality of first coil segments that cross over the magnetic layer, the first coil segments being separated from each other with predetermined gaps therebetween in the height direction; a coil insulating layer covering the first coil segments, the magnetic layer being formed on the coil insulating layer; a plurality of second coil segments that cross over the magnetic layer, the second coil segments being formed on the coil insulating layer; and a plurality of bank layers disposed at two sides of the magnetic layer in the track width direction, the bank layers being electrically connected with ends of the first coil segments; wherein ends of each second coil segment in the track width direction are electrically connected with upper faces of the bank layers to connect ends of the adjacent first coil layers with each other via the second coil segments, thereby forming a toroidal coil; a lower magnetic pole layer formed above the lower core layer and a gap layer including a nonmagnetic metal material formed on the lower magnetic pole layer, the lower magnetic pole layer and the gap layer being formed by plating, wherein the magnetic layer is formed on the gap layer and functions as an upper magnetic pole layer; the lower magnetic pole layer, the gap layer, and the magnetic layer constitute a first composite structure; the width of the first composite structure in the track width direction at the opposing face defines a track width  $T_w$ ; **but fails to show** that each banking layer includes a second composite structure including a first sublayer including



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the same material as the lower magnetic pole layer, a second sublayer including the same material as the gap layer, and a third sublayer including the same material as the magnetic layer.

- With regard to claim 6, Cohen et al and Komuro et al **fails to show** that each bank layer comprises the same material as the magnetic layer.
- With regard to claim 9, Cohen et al further shows that the bank layer includes Cu, **but fails to show** that it further includes at least one protective layer including Ni, CuNi, or NiP.
- Applicant asserts: the present relates to a head in which an electrical connection segments and second coil segments can be easily and reliably formed and in which the second coil segments are properly insulated from a magnetic pole (Specification, p. 1).

### **Conclusion**

7. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is 571-272-7570. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**TIANJIE CHEN**  
**PRIMARY EXAMINER**